

REMARKS

Claims 1-55 are pending in the present application.

Claims 1-53 and 55 have been rejected.

Rejections Under 35 USC § 102

The Examiner has rejected claims 1-3, 5, 45, 46, 48 and 51-53 under 35 U.S.C. 102(b) as being anticipated by Whitaker et al. (hereinafter "Whitaker", "*A Framework for Level Set Segmentation of Volume Datasets*").

*Regarding claim 1, Whitaker describes a method for editing a geometrical model with a level set modeling surface editor operator in the abstract lines 1-8. Whitaker also describes defining a level set model having at least one deformation thereon to be modified in section 3 2<sup>nd</sup> ¶ lines 5-10 ("...the level set formulation provides a set of numerical methods that describes how to manipulate...a volume..."). Whitaker describes performing a level set surface editing operation on a level set surface model, where the operation is defined by a level surface editing operator in section 3 2<sup>nd</sup> ¶ lines 3-7 ("...the surface deformation process moves the surface model...One must choose those properties of the input data to which...the shape of the model will have in the deformation..."), as shown in Figure 5, where it is described that a user is given the choice of whether to apply particular data to the surface deformation in section 4.2 1<sup>st</sup> ¶ lines 5-7 ("One must choose those properties of the input data to which the model will be attracted...in the deformation process...There are a variety of surface-motion terms that can be used..."), therefore the edge data disclosed in the 3<sup>rd</sup> ¶ of section 4.2 could be excluded from the deformation operation performed on the level set model surface. Whitaker also describes that an operation modifies the at least one deformation in section 6 1<sup>st</sup> ¶ lines 3-5.*

Applicant respectfully disagrees. The teaching of Whitaker is directed to steps taken during the extraction of models from volume data. There is no teaching, description, or suggestion in Whitaker of editing a surface model after it has been formed. Figure 6 describes the teachings of Whitaker in that input volume data is subjected to an initialization and then and then deformed into a surface. Section 4 of Whitaker defines these segmentation stages in section

4.1 (initialization) and 4.2 (level set surface deformation). Initialization is defined as the starting position of a surface. The level set surface deformation is moving the surface model toward features in the input data. In other words, Whitaker is directed to a method of extracting a surface from volume data. Applicant recognizes that changes in properties of input data as suggested in section 4.2 can lead to different surfaces being formed. However, this is distinct from the claims of the present application where editing functions are applied to a surface that is already formed. It is easier to edit a formed surface than to attempt to imagine what a formed surface should look like and manipulate input data iteratively to try to achieve a desired result. Referring to section 5 of Whitaker, paragraph 6; lines 2-9, which state "These parameters were obtained by first making a sensible guess based on the contrasts and sizes of features in the data and then *using trial and error* to obtain acceptable results. *Each dataset was processed between 4 and 8 times to achieve these results.* More tuning could improve things further, and once these parameters are set, they work moderately well for similar modalities with similar subjects. *The method is iterative*, but the update times are proportional to the surface area." (Emphasis added).

#### **Rejections Under 35 USC § 103**

The Examiner has rejected claims 4, 6 and 20-22 under 35 U.S.C. 103(a) as being unpatentable over Whitaker in view of Breen et al. (hereinafter "Breen", "*3D Scan Conversion of CSG Models into Distance Volumes*").

The Examiner has rejected claims 7-26, 30-35, 39, 40, 44, and 55 under 35 U.S.C. 103(a) as being unpatentable over Whitaker in view of Museth et al. (hereinafter "Museth", "*Level Set Surface Editing Operators*").

The Examiner has rejected claims 27-29, 36-38 and 41-43 under 35 U.S.C. 103(a) as being unpatentable over Whitaker in view of Museth in further view of Applicant's Admitted Prior Art (hereinafter "AAPA").

The Examiner has rejected claims 49 and 50 under 35 U.S.C. 103(a) as being unpatentable over Whitaker in view of Mauch ("*A Fast Algorithm for Computing the Closest Point and Distance Transform*").

Applicant respectfully disagrees. All dependent claims, being dependent on allowable base independent claim 1, are themselves allowable.

**Allowable Subject Matter**

The Examiner has objected to claim 54 as being dependent upon a rejected base claim, but stated it would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In view of the above amendments and remarks, applicants respectfully request that this application be reexamined and that the claims, as amended, be allowed.

Applicants also submit herewith a PETITION FOR EXTENSION OF TIME and tender the government fees for the extension.

Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 07-1896.

Respectfully submitted,

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